CLAIMS

1. A fuel cell (1) comprising:

an electrolyte membrane (2); and

a cathode catalyst layer (3) containing a metal catalyst (16), the cathode catalyst layer (3) facing a surface of the electrolyte membrane (2) in plural regions including a specific region in which a differential electric potential between the cathode catalyst layer (3) and the electrolyte membrane (2) during an electric power generation reaction of the fuel cell (1) is larger than in a region other than the specific region;

wherein one of an amount of the metal catalyst (16) and a specific surface area of the metal catalyst (16) in the cathode catalyst layer (3) in the specific region has a larger value than in the [other] region other then the specific region.

2. The fuel cell (1) as defined in Claim 1, wherein the cathode catalyst layer (3) contains catalyst particles (14) each of which comprises a support (15), and the metal catalyst (16) supported on the support (15), and wherein an amount of the catalyst particles (14) per unit area of the cathode catalyst layer (3) in the specific region is set to a greater value than in the [other] region other than the specific region.

3. The fuel cell (1) as defined in Claim 1, wherein the cathode catalyst layer (3) contains catalyst particles (14) each of which comprises a support (15),

and the metal catalyst (16) supported on the support (15), and wherein a weight ratio of the metal catalyst (16) to the support (15) is set to a greater value in the specific region than in the [other] region other than the specific region.

4. The fuel cell (1) as defined in Claim 3, wherein an amount of the catalyst particles (14) per unit area of the cathode catalyst layer (3) in the specific region is equal to an amount of the catalyst particles (14) per unit area of the cathode catalyst layer (3) in the [other] region other than the specific region.

5. The fuel cell (1) as defined in Claim 1, wherein the cathode catalyst layer (3) contains catalyst particles (14) each of which comprises a support (15), and the metal catalyst (16) supported on the support (15) in the form of minute particles, and wherein the specific surface area of the minute particles of the metal catalyst (16) is set to a greater value in the specific region than in the [other] region other than the specific region.

6. The fuel cell (1) as defined in Claim 5, wherein a diameter of the minute particles of the metal catalyst (16) in the specific region is smaller than a diameter of the minute particles of the metal catalyst (16) in the [other] region other than the specific region.

7. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the specific region is set as a region in which a current density during the

electric power generation reaction of the fuel cell (1) is smaller than in the [other] region other than the specific region.

8. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the specific region is set as a region in which a moisture content of the electrolyte membrane during the electric power generation reaction of the fuel cell (1) is higher than in the [other] region other than the specific region.

9. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the fuel cell (1) further comprises an anode catalyst layer (4) facing another surface of the electrolyte membrane (2), the fuel cell (1) is constituted to perform electric power generation by means of an electrochemical reaction through the electrolyte membrane (2) between oxygen in an oxidant gas supplied to the cathode catalyst layer (3) and hydrogen in a fuel gas supplied to the anode catalyst layer (4), and the specific region is set as a region in which a humidity of one of the oxidant gas and the fuel gas during the electric power generation reaction of the fuel cell (1) is higher than in the [other] region other than the specific region.

10. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the fuel cell (1) further comprises an oxidant gas passage (8) which supplies an oxidant gas to the cathode catalyst layer (3), the oxidant gas passage (8) facing the cathode catalyst layer (3), and the specific region is set as a region corresponding to a downstream portion of the oxidant gas passage (8)

11. The fuel cell (1) as defined in Claim 10, wherein the oxidant gas passage (8) comprises an oxidant gas convergence portion (8a) at a point thereon, and the specific region is set in relation to a flow rate of the oxidant gas in the oxidant gas passage (8) as a region directly upstream of the convergence portion (8a) and a region corresponding to the downstream portion of the oxidant gas passage (8), which is removed from the directly upstream region by a gap.

12. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the specific region is set as a region in which a temperature of the cathode catalyst layer (3) during the electric power generation reaction of the fuel cell (1) is lower than in the [other] region other than the specific region.

13. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the fuel cell (1) further comprises a cooling water passage (12) which cools the fuel cell (1) during the electric power generation reaction, and the specific region is set as a region corresponding to an upstream portion of the cooling water passage (12).

14. The fuel cell (1) as defined in any one of Claim 1 through Claim 6, wherein the fuel cell (1) further comprises a current extraction portion (23) connected electrically to the cathode catalyst layer (3), and the specific region is set as a region removed from the current extraction portion (23).